

**What is Claimed:**

1. A chemical processing apparatus comprising:  
a pressure vessel; and  
a microreactor disposed within the pressure vessel, the pressure vessel constructed and arranged to maintain the pressure vessel and the microreactor at elevated pressure when a chemical operation is performed within the apparatus,  
wherein the microreactor comprises a material selected from the group consisting of nonmetallic elements of groups III, IV and V of the Periodic Table, ceramics, glasses, glass ceramics, polymers, composite materials, silicon and metals.
2. The chemical processing apparatus of claim 1 wherein the pressure vessel comprises an autoclave.
3. The chemical processing apparatus of claim 1 further comprising a heat conductive medium communicating with the microreactor within the pressure vessel.
4. The chemical processing apparatus of claim 3 wherein the heat conductive medium comprises SiC.
5. The chemical processing apparatus of claim 1 wherein the microreactor is configured to accommodate any of a plurality of operations.
6. The chemical processing apparatus of claim 1 further comprising a first inlet fluid feedline passing through the pressure vessel and into the microreactor for increasing the pressure within the microreactor and a second inlet fluid feedline extending into the pressure vessel for increasing the pressure within the pressure vessel.

7. A chemical processing apparatus comprising:
  - a pressure vessel;
  - a microreactor comprising a wherein the microreactor comprising a material selected from the group consisting of nonmetallic elements of groups III, IV and V of the Periodic Table, ceramics, glasses, glass ceramics, polymers, composite materials, silicon and metals and housed with the pressure vessel; and
  - a sealing mechanism cooperating with the pressure vessel to maintain the microreactor and the pressure vessel at elevated pressure while a chemical operation is performed within the apparatus.
8. The chemical processing apparatus of claim 7 wherein the microreactor and the pressure vessel each define an internal volume and wherein the internal volume of the microreactor is open to the internal volume of the pressure vessel.
9. The chemical processing apparatus of claim 7 wherein the microreactor and the pressure vessel each define an internal volume and wherein the internal volume of the microreactor is sealed with respect to the internal volume of the pressure vessel.
10. The chemical processing apparatus of claim 7 further comprising a heat conductive medium in thermal communication with the microreactor within the pressure vessel.